

HUMAN HEALTH & DISEASE

Health ^{for a long time} _{was considered} State of body & mind where ^{there is} Balance of human _{orgs}

Indian Ayurveda
System of medicine

Said by

Hippocrates
(Early Greek)

It was thought that → Person with 'black bile' belonged to → Not personality
→ would have fever -s.

this idea was arrived at by

Pure Reflection though

William Harvey's → Blood circulation discovery using ^{Experimental method}

Demonstration of normal body temp in person with black bile.

In Later years
↓ biology stated

Mind influences
↓ through

neural system

Endocrine system

our

Immune system

which maintains

Health

* Mind
Mental state

can affect our

Health

Health is affected by

Genetic disorders

deficiencies with which a child is born & which child inherits from parents to offsprings.

Infections

Lifestyle

including food
↓ water
↓ rest
↓ exercise

Health

does not only mean

defined as

"absence of disease"

OR
"physical fitness"

When people are healthy

State of Complete

physical mental social

well being

They are more efficient at work

Increases productivity

Brings economic prosperity

increase longevity of people

decreases
• IMR
• MMR

To maintain Good health

Balanced diet
Personal hygiene
Regular exercise

Yoga has been practised since time immemorial.

Physical health

Mental health

to achieve

To achieve good health

Maintenance of hygiene of food & water

Control of vectors

Proper disposal of waste

Immunisation/Vaccination

Awareness about disease & its effects on bodily functions

Not healthy / Disease → When '1 or more' organs or system of body adversely affected
Characterised by - appearance of various signs & symptoms

Infectious

- Very common
- Every one of us suffer from these

AIDS - fatal

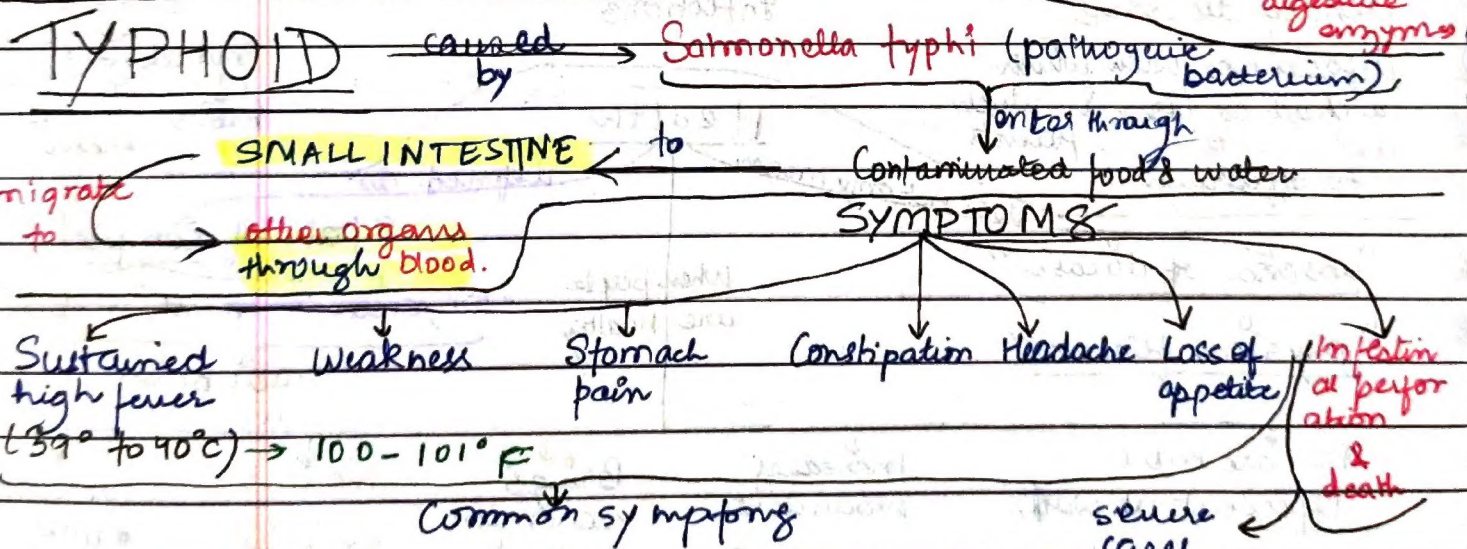
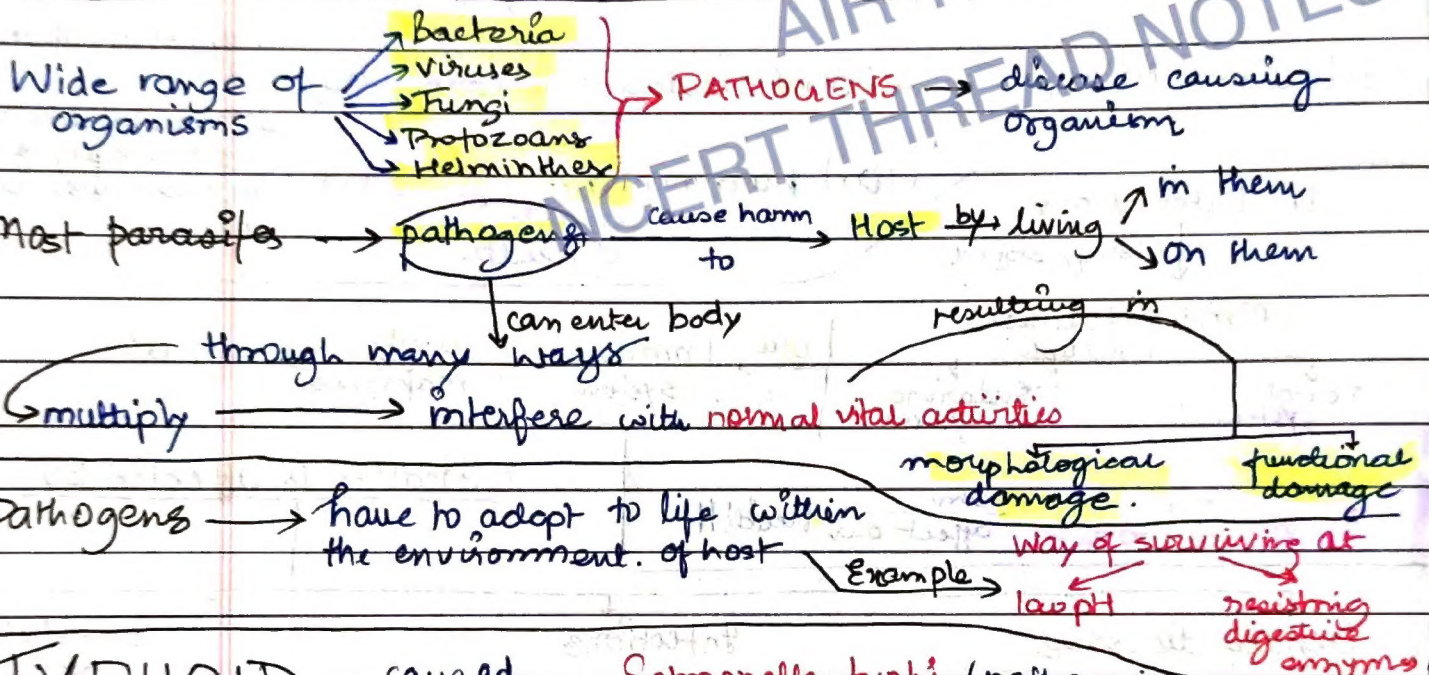
* AIDS & cancer
Kill a large no. of people worldwide.

Non-infectious - a/c.

CANCER - major cause of death

Drug & Alcohol abuse

COMMON DISEASES IN HUMANS



CONFIRMATORY TEST - **WIDAL TEST**

CLASSIC CASE IN MEDICINE - **Mary Mallon** (Nickname - Typhoid Mary)

Food she prepared.

"Typhoid carrier"

continued to spread typhoid for several years

Cook by profession

NEUMONIA

Bacteria responsible

Streptococcus Pneumonia
Haemophilus Influenzae

infects

alveoli in Lungs
air filled sacs

as result they get

filled with fluid

symptoms

severe problems in respiration

leading to

fever chills Cough headache

common symptoms

Lips

Finger nails

In severe cases

turn → gray → Bluish

* Infection occurs by → by → inhaling droplets/aerosol released by infected person.

Bacterial disease

by → sharing utensils, glasses with infected person.

Typhoid

Pneumonia

Dysentery

Plague

Diphtheria

* Many virus causes disease in human beings.

COMMON COLD

caused by

Rhino Virus

infects

Nose

~~Lungs~~

Respiratory passage

One of the most infections which causes no disease

represent one such group of viruses,

characterised by

Nasal congestion

Nasal discharge

Sore throat

Hoarseness

cough

headache

irritation

(lasts for 3-7 days)

Infection is caused by

healthy person

Inhaling directly, droplets resulting from cough or sneeze of infected person

indirectly cause infection in

transmitted by pens, book, cups, door knobs, mouse, computer keyboard and

AMOEBIASIS

caused by

Protozoan parasite Entamoeba Histolytica

SYMPTOMS

Constipation

Abdominal pain

Cramps

Stools

excess mucus

blood clots

→ Mechanical carriers : Houseflies

transmit

Parasite from

faeces of infected person

contaminating them

Food

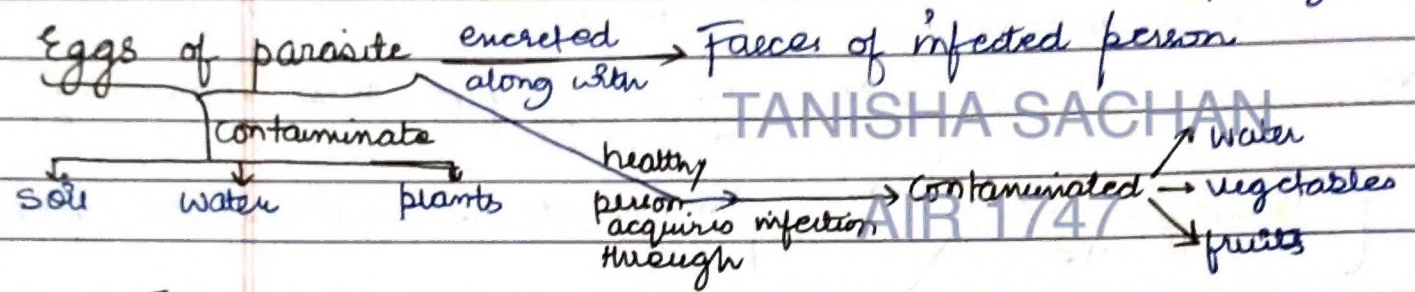
to

a Main source of infection → Drinking water / Food contaminated by fecal matter

ASCARIASIS

caused by helminth → Ascaris (Round worm)
↓
intestinal parasite

- Symptoms
- Internal bleeding
 - Muscular pain
 - Fever
 - Anaemia
 - Blockage of intestinal passage



FILARIASIS / Elephantiasis

caused by helminth filarial worm

Slowly developing inflammation (chronic) of the organs

↓ in which they live for many years

causes { Wuchereria Bancrofti, W. Malayi }

Pathogen transmitted by

usually in lymphatic vessels of lower limbs

Bite of female culex mosquito

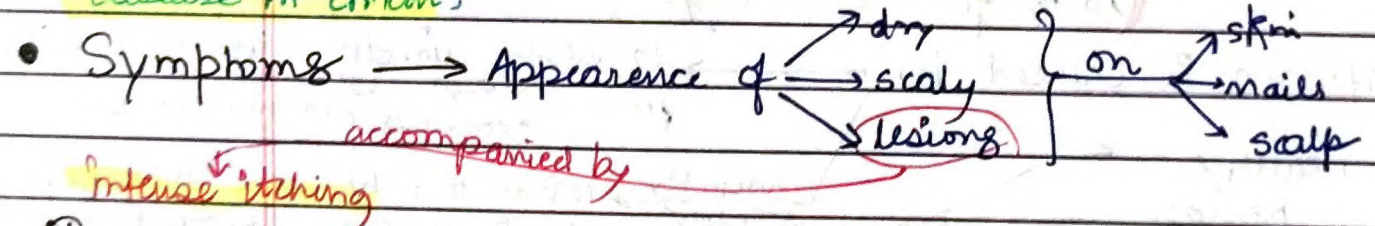
* Genital organs gets affected resulting in Gross deformities

RINGWORMS

caused by many fungi belonging to genera

- Microsporum
- Trichophyton
- Epidermophyton

one of the most infectious disease in man.



* Heat & Moisture helps Fungi to grow → makes them thrive well in skin folds b/w toes

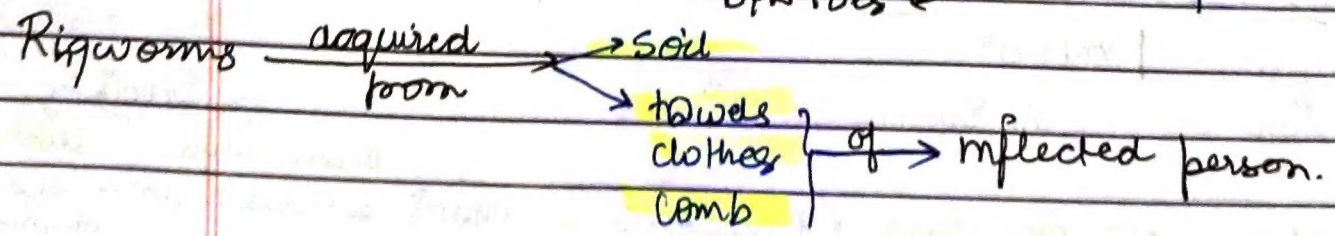
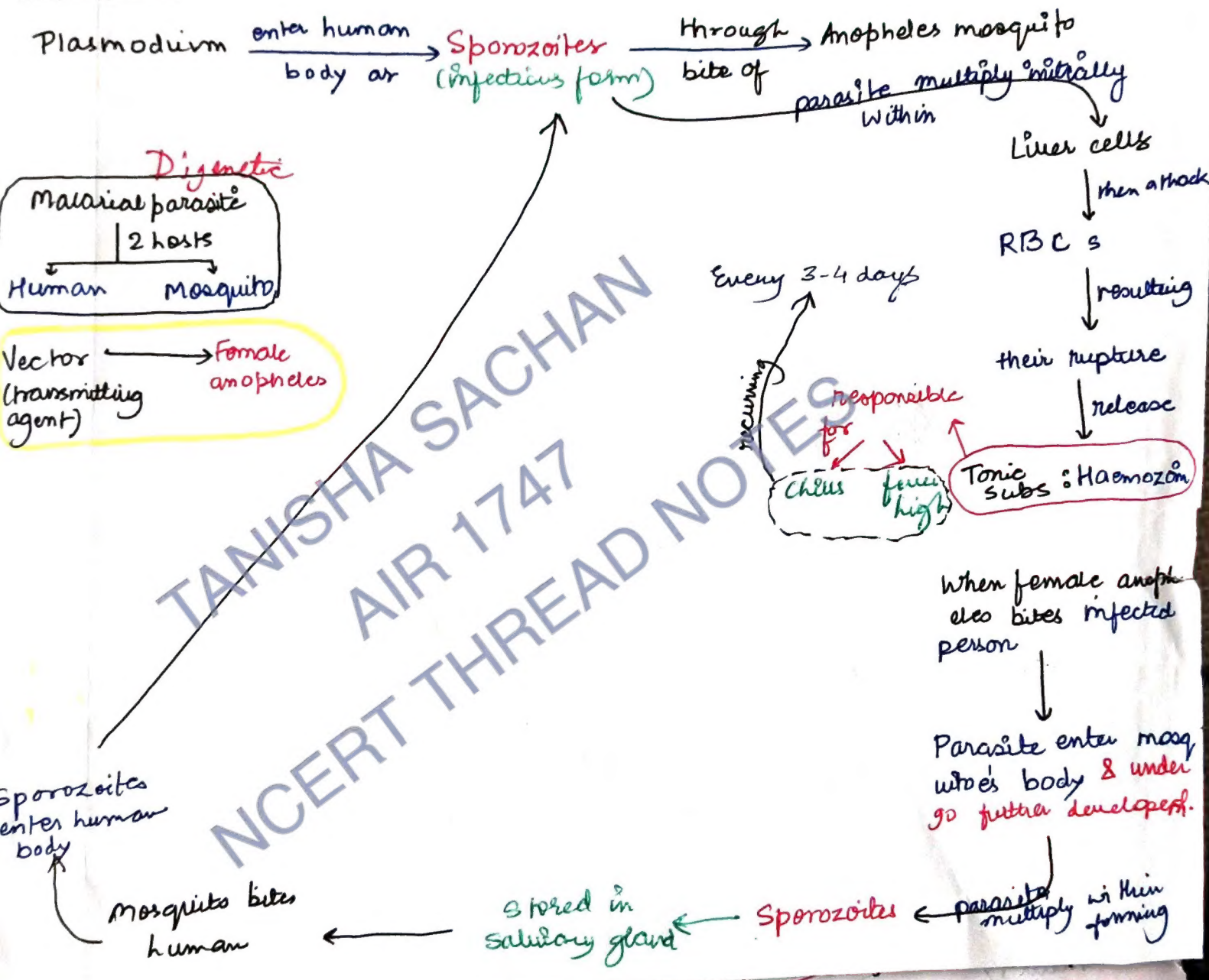




Figure 8.1 Stages in the life cycle of *Plasmodium*

Malaria caused by Protozoan: Plasmodium (tiny)
 many diff. species → P. vivax, P. malaria, P. falciparum
 P. falciparum causes Malignant Malaria (most serious, fatal)
 disease man has been fighting for years.

Life cycle



Maintenance of ^{personal} hygiene is **very important** for ^{public} prevention of many infectious diseases.

① Measures for personal hygiene:

- 1) Keeping body clean
- 2) Consumption of clean drinking water, food, veget., fruit

② Public hygiene includes:

- 1) Proper disposal of ^{waste} excreta
- 2) Periodic cleaning & disinfection of ^{pools (cess pools)} water reservoirs tanks
- 3) Observing standard practices of hygiene in public catering.

measures are particularly essential where the infectious agents transmitted through food water such as typhoid, Amoebiasis, Ascariasis.

③ In case of Air borne disease such as pneumonia, common cold.

above measures along with

close contact with infected person

close contact with infected person's belonging.

④ For disease like malaria, Filariasis transmitted through vector (insects).

most important measure is

control/eliminate

vectors

breeding places.

Can be achieved by:

- 1) Avoiding stagnation of water → in around } residential areas
- 2) Regular ~~bar~~ cleaning of household coolers Date ___/___/___
- 3) Use of mosquito nets.
- 4) Introducing fishes like Gambusia in ponds that feed on larvae of mosquito.
- 5) Spraying insecticides in → ditches
→ drainage area
→ swamps.

6) Doors & Windows → should be provided with nets.

such measures more imp. in
Widespread incidence of Vector borne diseases like dengue & chikungunya in many parts of country.

Advancements made in biological science have armed us to effectively deal with many infectious diseases.

Vaccines & Immunisation programs have enabled us to completely eradicate a deadly disease like Small pox.

Large no. of infectious diseases like

polio, tetanus, diphtheria, pneumonia

have been controlled by use of vaccine to large extent.

Biotechnology

has helped in making

newer safer

Vaccine

Discovery of antibiotic

2 various other drugs

enabled us to effectively treat infectious diseases

IMMUNITY

Everyday → we are exposed to → A large no. of **infectious agents**.
 Body is able to defend itself from most of these foreign agents ← **bcz** → **Disease** ← only few results in
 → **IMMUNITY**: Overall ability of the host to fight disease-causing organisms
 immune system ← composed by

Immunity
12 types

Innate Immunity

Acquired Immunity

INNATE IMMUNITY

* **Non specific** type of defence → present at → Time of birth
 → accomplished by → providing different types of barriers to the entry of foreign agents into our body.
 1st line of defence 2nd line of defence

4 types of barriers

Physical Barriers

Skin → **main barrier**
 ↓ prevents
 entry of micro-organism

Mucus coating of epithelium of
 Respiratory tract, Gastrointestinal tract, Urogenital tract

help in trapping microbes entering our body

Physiological Barriers

• Acid in stomach
 • Saliva in mouth
 • Tears from eyes

↓ all prevent
 microbial growth

Cellular Barriers

• Certain types of leukocytes (WBC) like

PMN2 neutrophils, Monocytes, Natural killer, Macrophages
 Polymorpho nuclear leukocytes, type of lymphocytes

phagocytose & destroy microbes

Cytokine barriers

Virus infected cells
 ↓ secrete proteins
 ↓ called interferons

Non infected cells
 ↓ from further viral infections

ACQUIRED IMMUNITY

3rd line of defence.

* **pathogen specific**

* **characterised by memory**

Body encounters Pathogen → for 1st time → produce Primary Response.
 ↓
 low intensity

Subsequent exposure \rightarrow with same pathogen \rightarrow Anamnestic response
 ascribed to the fact body appears to have memory of 1st encounter.
 highly intensified response \leftarrow Secondary response

Primary Response + Secondary Response \rightarrow carried with the help of 2 special lymphocyte in blood \rightarrow B-lymphocyte \rightarrow T-lymphocyte

B lymphocyte

produce
 Army of proteins
 in response to pathogens
 into blood to fight them
 these proteins called Antibody

T-lymphocyte

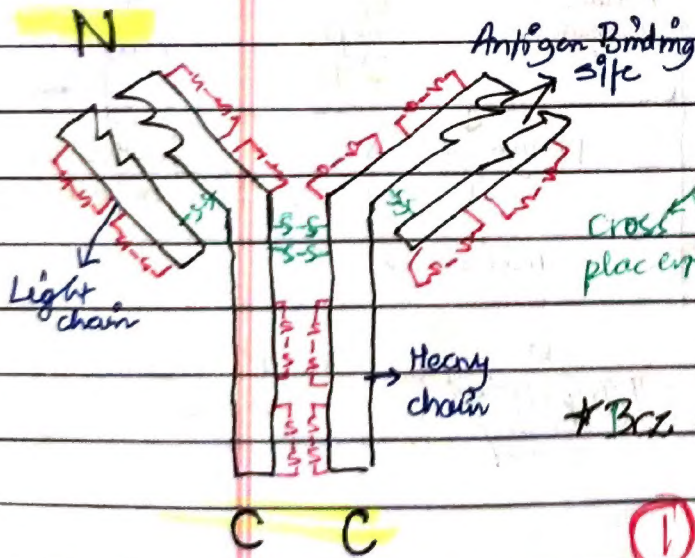
themselves
 Do not secrete antibodies
 but
 Help B cells to produce them.

Each antibody has \rightarrow 4 peptide chains

2, small LIGHT CHAINS

H_2L_2

2, Longer HEAVY CHAINS



Different types of Antibodies

IgG, IgA, IgM, IgD, IgE

cross placenta
 colostrum

quantity decrease

allergy

* Bcz antibodies are produced in blood
 \downarrow this response

1 Humoral Immune Response

Acquired immune response

2 Cell mediated immune response (CMI)

mediated by T-lymphocytes
 Responsible for graft rejection

Grafts from Any source
 → animal
 → another primate
 → Any human being
 } cannot be made
 as it
 will be rejected sooner or later.

1) Tissue matching

2) Blood group matching

essential before

undertaking any graft

Patient has to take immunosuppressant all her/his life.

* Body → able to differentiate
 → self
 → non-self.

Active & Passive Immunity

• Host when exposed to antigens
 → Living microbes
 → Dead microbes
 → Other proteins
 } Antibodies produced in host bodies.

slow

ACTIVE IMMUNITY

takes time to give full effective response.

induces

Injecting microbes deliberately during immunisation.

Infectious organism gaining access into body during NATURAL INFECTION

* When Ready made antibodies directly given to protect body against foreign agents

called
 PASSIVE IMMUNITY

Colostrum

- Yellowish fluid
- Secreted by mother during initial days of lactation
- Has abundant antibody IgA

Fetus receives antibodies from mother through placenta.

Vaccination & Immunisation

* Principle of Immunisation/Vaccination based on Memory of the immune system.

a preparation is introduced in body

Antigenic proteins of pathogen

Inactivated pathogen

Weakened pathogen.

Antibodies $\xrightarrow{\text{produced in body}}$ Against antigens \rightarrow Would neutralise pathogenic agent during actual infection.

Vaccines $\xrightarrow{\text{generate}}$ $\left\{ \begin{array}{l} \text{memory B cells} \\ \text{memory T cells} \end{array} \right\}$ that recognise infection pathogen quickly on subsequent exposure

Massive prod. of antibodies $\xleftarrow{\text{with}}$ overwhelm the invaders $\xleftarrow{\text{with}}$

If person $\xrightarrow{\text{infected with}}$ some deadly microbes $\xrightarrow{\text{to which}}$ Quick immune response needed.

directly inject the $\xleftarrow{\text{we need to}}$ ① TETANUS $\xleftarrow{\text{as in}}$

\rightarrow Preformed antibodies OR Antitoxin preparation containing Antibodies to toxin

② SNAKE BITES

Injection \rightarrow Preformed antibodies against snake venom.

① & ②
passive immunisation

★ Recombinant DNA technology has allowed production of ★ antigenic polypeptides of pathogen

Vaccine prod. using this approach

Bacteria Yeast

Allow large scale prod. $\xrightarrow{\text{hence}}$ Greater availability of immunisation \leftarrow for

Example

\rightarrow Hepatitis B vaccine produced from Yeast

ALLERGIES

When u go to a new place \rightarrow suddenly start \rightarrow sneezing wheezing

\rightarrow for no inflamed reaction

Some of us are sensitive to some particles in environment

could be due to

Allergy to

pollen
mites

different in different places

Aggravated Response of Immune system to certain antigens

Allergy

is called

present in environment

* Substance to which such an immune response is produced

are called **Allergens**

Antibody prod. type

IgE

mites
↓
in dust

pollens

Animal dander

Symptoms of allergic reactions

Sneezing

Watery eyes

Running nose

Difficulty in breathing

Allergy

is due to

Release of **Histamine** & **Serotonin**

↓ from

Mast cells

For determining Cause of allergy

patient → exposed
→ injected

A small amt. of possible allergens

RRn studied then

Use of drugs like

anti histamine

corticosteroids

Steroids

Symptoms of allergy

quickly reduce

Modern day lifestyle

resulted in

↓ lowered immunity

↓ more sensitivity to allergens

Sensitivity to the environment

due to

Allergy
↓
Asthma

suffer from

more & more children in metro cities

This could be because of

Protected environment

provided in early life

AUTO-IMMUNITY

* Memory based Acquired Immunity

Evolved in higher vertebrates

ability to differentiate foreign org. (eg. pathogen) from self cells

based on

* Two corollaries of this ability

① Higher vertebrates can distinguish between self & non self
most experimental immunology deals with this aspect

① foreign molecules
② foreign organisms

② Due to genetic & other unknown reasons

body attacks Self cells

Auto immune disease

called

Damage to body

results in

Example

Rheumatoid Arthritis

affects many people in our society

Immune System in Body

★ Human Immune system consists

- lymphoid organs
- tissues
- cells
- soluble molecules

↓ like antibodies

in the sense

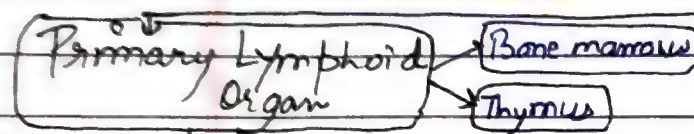
it recognises foreign antigens

plays an important role in

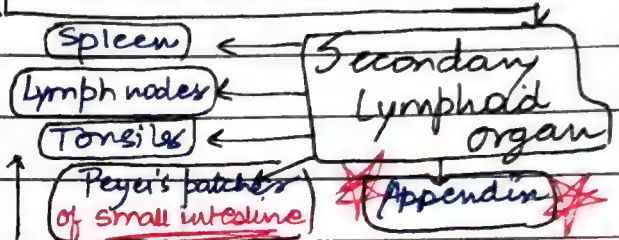
Respond to these & remember them

LYMPHOID ORGANS

◎ Organ where → origin
→ maturation
→ proliferation of LYMPHOCTES occurs



immature lymphocytes differentiate to antigen sensitive lymphocytes



Provide site for interaction of lymphocyte with antigens
proliferate to become effector cells

NCERT THREAD NOTES

Bone Marrow → main lymphoid organ where all blood cells + lymphocytes produced

Thymus → Quite large → at birth
• lobed organ
• near heart
• beneath breastbone (sternum)
• Receptor reducing in size with age till puberty → reduces to very small size

Micro-environment for development of T-lymphocyte

Spleen → both provide
→ LARGE (not small)
→ BEAN SHAPED
mostly contains lymphocytes + phagocytes
acts as "filter of the blood" by trapping blood borne micro-organisms
large reservoirs of erythrocytes

LYMPH NODES → small solid structures located at different points along lymphatic system.
antigens trapped here → serve to trap micro-organisms + other antigens → which get into lymph + tissue fluid
responsible for activation of lymphocyte → cause immune response

Lymphoid tissue located within lining of → major tracts
called → MALT (Mucosa associated Lymphoid Tissue) in human body constitute about = 50% of lymphoid tissue

Infectious disease

a gap of symptoms

AIDS

stands for

Acquired Immunodeficiency Syndrome

means

1st reported in 1981

congenital disease

deficiency of immune system, acquired during lifetime of an individual

25 yrs → Spread all over world
→ Killing > 25 million person.

HIV

Human Immunodeficiency Virus

not

a member of

Retrovirus

RNA genome enclosed by envelope

transmission by

- Sexual contact with infected person.
- By transfusion of contaminated blood
- By sharing infected needles in case of intravenous drug abuse
- Infected mother to child through placenta.

- people with multiple sexual partners
- drug addicts who take drug intravenously
- People who require repeated blood transfusion
- Child born to HIV infected mother.

Spread by

- direct touch
- physical contact

hence

It is imperative, for the physical & psychological being

Body fluids

* Incubation period → 5-10 yrs
infection → time lag → appearance of symptoms

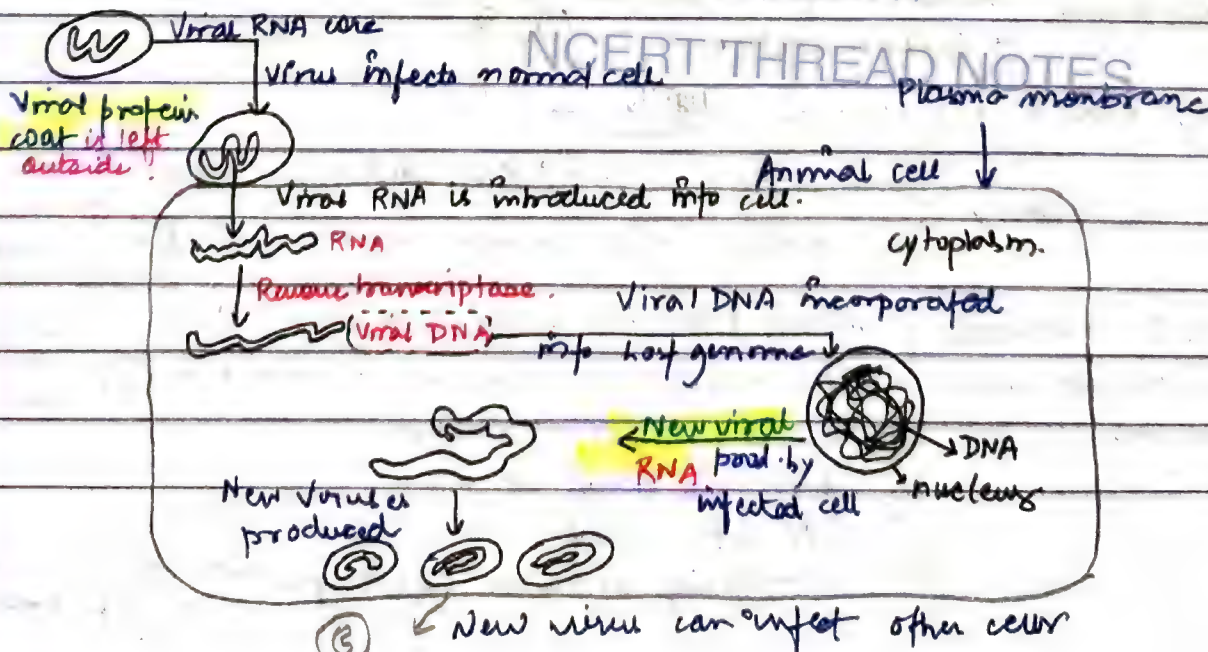
that HIV/AIDS infected persons are not isolated from family & society

TANISHA SACHAN

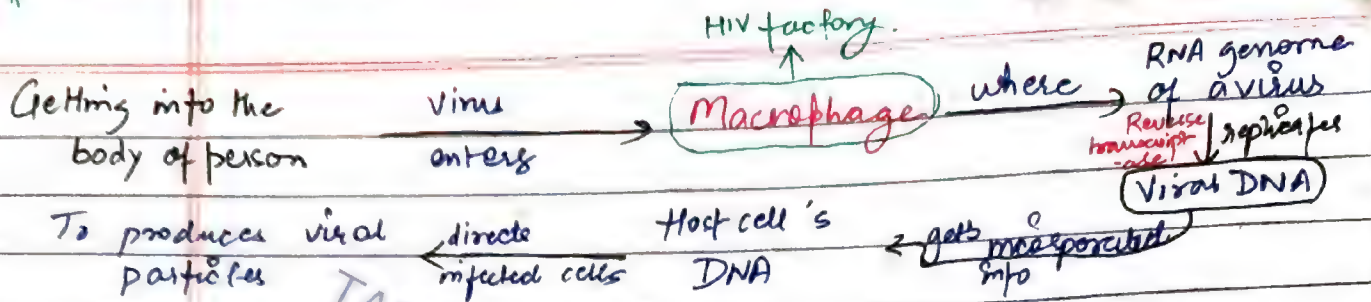
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NCERT THREAD NOTES

Retrovirus



★ Infected cell → can survive while viruses are being replicated & released.



SIMULTANEOUSLY,

HIV enters Helper T-lymphocytes (TH). → replicates & prod. Progeny viruses

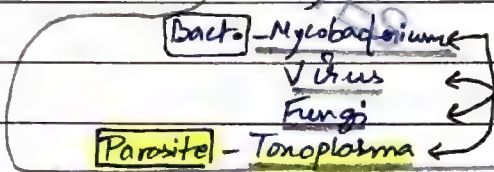
Progressive decrease in no. of TH cells

results in Blood & attack other TH cells. released info

during this period, person suffers from

During ↓ in TH cells, → person start suffering from infection that could have been otherwise overcome

- Bouts of fever
- Diarrhoea
- Weight loss



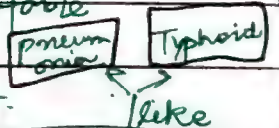
* Patient becomes → so immunodeficient → he/she unable to protect against infections

DIAGNOSTIC TEST for AIDS → Enzyme linked Immuno Sorbent assay (ELISA)

TREATMENT OF AIDS → **Retroviral Drugs** → Partially effective

- Prolong the life
- Doesn't prevent death, is inevitable

PREVENTION OF AIDS → No cure, so prevention is best.



- HIV Spreads → due to conscious behavioural pattern **not that it happens inadvertently.**

- Infection in blood transfusion patients & newborn babies → due to poor monitoring

- Only cause → ignorance → rightly said → "Don't die of ignorance!"

- In our country → NACO - National AIDS control organisation, NGO - Non governmental organisation → doing a lot to educate people on AIDS.

- WHO → started many programmes to prevent HIV infection:
 - ① Making blood (from banks) safe from HIV
 - ② Use of disposable syringes & needle in private hospitals
 - ③ Free distribution of condoms
 - ④ Controlling drug abuse
 - ⑤ Advocating safe sex
 - ⑥ Promoting regular checkups for HIV in susceptible populations

HIV → shouldn't be hidden ^{since} then → Infection may be spread to many more people.

CANCER

① most dreaded disease

② major cause of death all over the globe.

Large no. of them die annually. → 2 million suffer from it.

(*) Most interse areas of Research in
 → Biology
 → Medicine
 } Mechanism that underlie development of cancer or **oncogenic transformation** of cells.
 } Control of cancer
 } Treatment of cancer

In body
 → Cell growth
 → Differentiation } highly controlled & regulated

Normal cells show Property of **contact inhibition**

↓ by virtue of which

contact with other cells **inhibit** their uncontrolled growth

→ Cancer cells **have lost their property**

RESULT →

Cancer cells continue to divide giving rise to **masses of cells**

↓ called **Tumors**

Benign Tumor

- ① normally remain confined to original positions
- ② Do not spread to other parts
- ③ Cause little damage.

Malignant tumor

① mass of proliferating cells called **neoplastic or tumor**

② Cells grow rapidly

③ **Invading & damaging** surrounding tissue cells

④ Cells actively divide & grow

⑤ Starve normal cells by **competing for vital nutrients**.

⑥ **METASTASIS** → **met** = moved property of malignant tumor cells sloughed off

reach → distant sites **through blood**

→ wherever they get lodged **start new tumor there**

CAUSES OF CANCER & agents called Carcinogen

Physical Carcinogen

① Ionizing Radiation
 X rays → γ rays

② Non ionizing Radiat.
 UV rays

causes **DNA damage**
 ↓ leading to **neoplastic transformation**

Chemical Carcin.

Present in

↓

Tobacco smoke

↓ causes

Lung Cancer

Biological Carcino.

Cancer causing viruses → **Oncogenic viruses**

genes have **Viral Oncogene**

• Cellular oncogene/Protooncogene

are identified in normal cells

which when **activated** under certain cond.

Oncogenic transform. of cells

Cancer Detection & Diagnosis

Early detection of cancer → Essential as it allows Disease to be treated successfully in many cases.

Biopsy

Histopathological studies

Bone marrow tests

In biopsy → a piece of suspected tissue

tissue

blood.

for ↑ cell counts in case of Leukemias

cut into thin sections

↓
stained & examined under microscope in histopatholog. studies by pathologist.

To detect cancer of Internal Organ

Radiography

↓ uses

X-rays

CT scan (Computed Tomography)

↓ uses

X-rays

↓ to generate 3D image of the interiors of object

MRI (Magnetic Resonance Imaging)

↓ uses

Strong Magnetic fields

Non ionizing Radiations

to detect accurately

① Pathological change ② Physiological change in living tissue

Antibodies against cancer-specific antigens

used for

Detection of certain cancers.

Techniques of molecular biology applied to detect Genes → Inherited susceptibility to certain cancers.

Identification of such genes which predispose an individual to certain cancers may be very helpful in Prevention of cancer.

Such individuals may be advised to avoid exposure to particular carcinogen to which they are susceptible [e.g. tobacco smoke]
[Living Cancer] ← in case of

TREATMENT OF CANCER are

Surgery
Radiation therapy
Immunotherapy

Radiotherapy

Tumor cells → irradiated lethally

taking proper care of surrounding normal tissues.

Several chemotherapeutic drugs

used to kill cancerous cells

* Some drugs are specific for particular tumours.

Majority of drugs have Side effects

hair loss, Anaemia

Most cancers treated by combination of

- surgery
- Radiotherapy
- Chemotherapy

① Tumor cells shown to Avoid $\left\{ \begin{array}{l} \text{detection} \\ \text{destruction} \end{array} \right\}$ by immune system

② Patients are given α -Interferon } biological response modifiers }
 activates the immune system \rightarrow destroying tumor

DRUGS AND ALCOHOL USE

Drugs abused $\left\{ \begin{array}{l} \text{Opioids} \\ \text{Cannabinoids} \\ \text{Coca alkaloids} \end{array} \right.$

* Majority of drugs obtained from Flowering plants

* Some are obtained from Fungi

\rightarrow especially in youths

OPIOIDS

Bind to \rightarrow Specific opioid receptors present in
 CNS Gastrointestinal tract

* Commonly called \rightarrow "Smack"

Diacetylmorphine

White bitter odour-test Crystalline

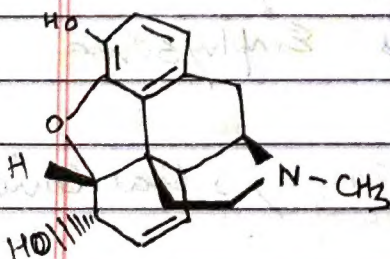
obtained by

\rightarrow Acetylation of morphine

Latex of poppy plant (Papaver somniferum)

① Generally taken by \rightarrow snorting
 ② injection

③ Heroin \rightarrow depressant
 \rightarrow slows down body functions



CANNABINOIDS

group of chemicals which \downarrow interact with

Cannabinoid receptor present in

BRAIN

Natural cannabinoids

\downarrow obtained from

Inflorescence of (plant) Cannabis sativa

- Flower tops of used in various combination
- leaves of \rightarrow Cannabis plant
- Resin of \rightarrow used in various combination

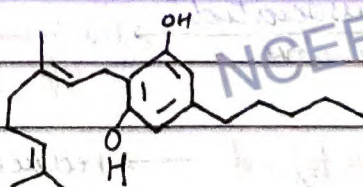
to produce

Hashish charas Marijuana Ganja

① Generally taken by \rightarrow Inhalation
 \rightarrow Oral ingestion

② Effects \rightarrow Cardiovascular system of body

* Cannabinoids are abused by some sports person.



COCA ALKALOID

obtained from

Erythroxylum Coca

Native of South America

It interferes with \rightarrow transport of neurotransmitter Dopamine

Cocaine commonly called \rightarrow coke crack

* Usually snorted *

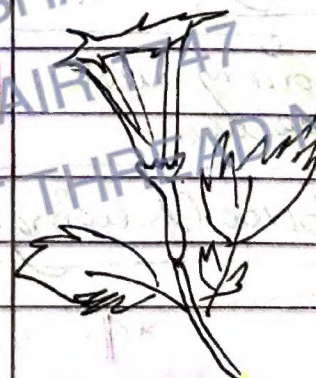
Potent stimulating on \rightarrow CNS action

Euphoria

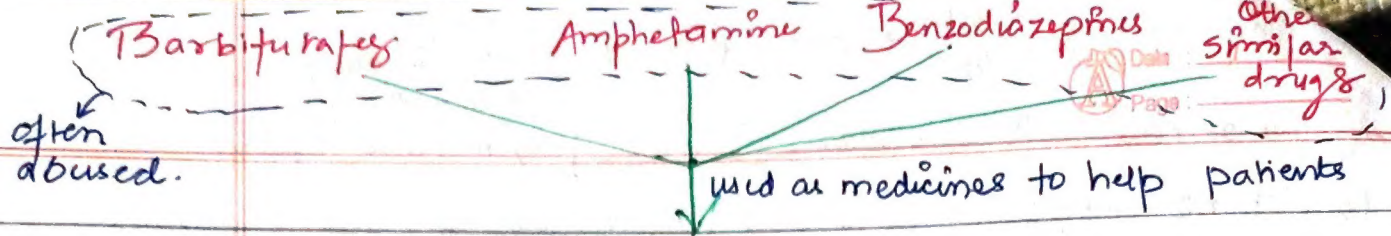
producing a sense of increased energy

Excessive dosage \rightarrow cause hallucinations of cocaine

Other plants \rightarrow Atropa belladonna cause hallucinations



Datura



Cope with mental illness like Depression, Insomnia

* Morphine $\xrightarrow{\text{very effective}}$ Sedative Painkiller $\xrightarrow{\text{very useful for patients}}$ who have undergone surgery.

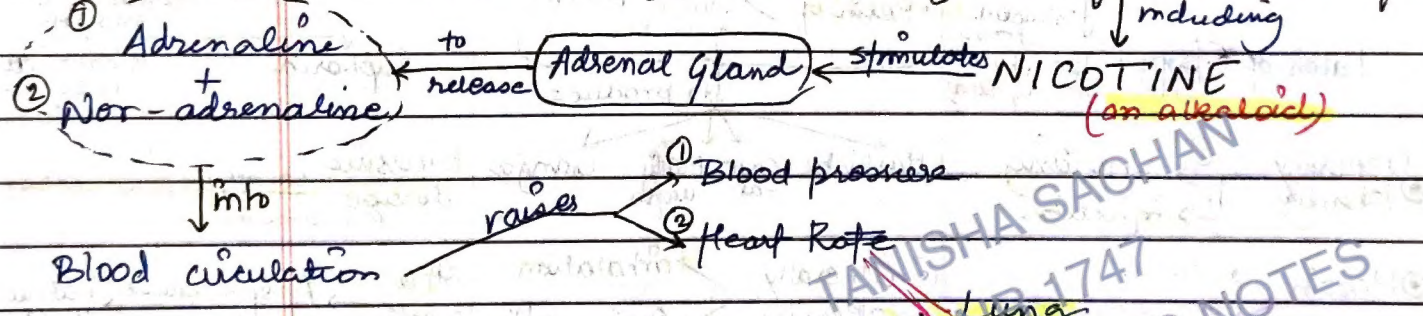
Several plants (Fruits, Seeds) $\xrightarrow{\text{having hallucinogenic properties}}$ used for 100 years in Folk medicine, Religious ceremonies, Rituals all over globe.

Drug Abuse — When these are taken for a purpose other than medicinal use or in amounts/frequency that impairs one's $\xrightarrow{\text{physical funct.}}$ $\xrightarrow{\text{physiological funct.}}$ $\xrightarrow{\text{psychological funct.}}$

Smoking \downarrow paves way for hard drugs

* Tobacco \rightarrow used by human beings for > 400 years. \rightarrow contains a large no. of chemicals subst. including

smoked, chewed, Snuffed



Smoking is associated with increased cancer of Lung, Urinary Bladder, Throat.

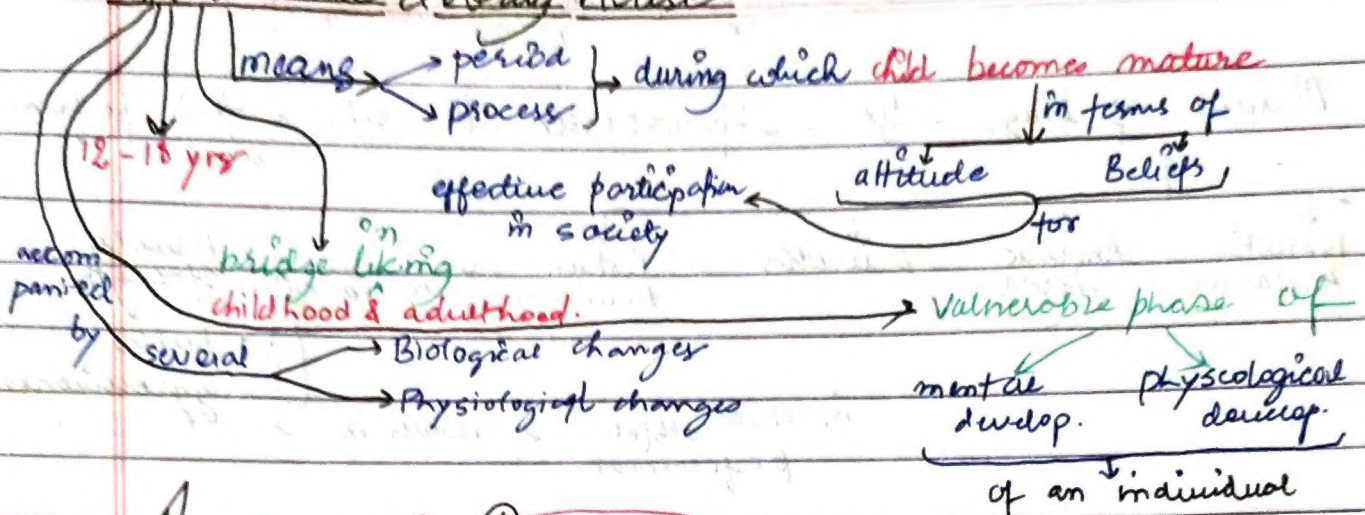
Coronary heart disease, Gastric Ulcer, Bronchitis, Emphysema

Tobacco Chewing associated with increased risk of cancer of Oral Cavity

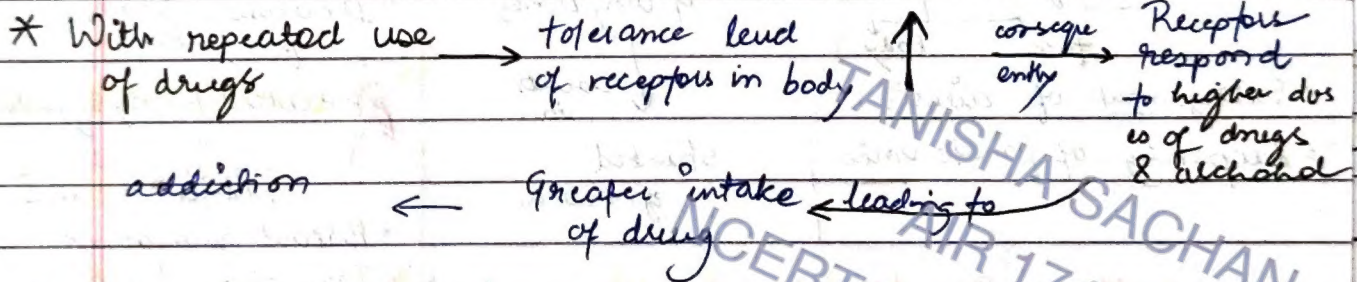
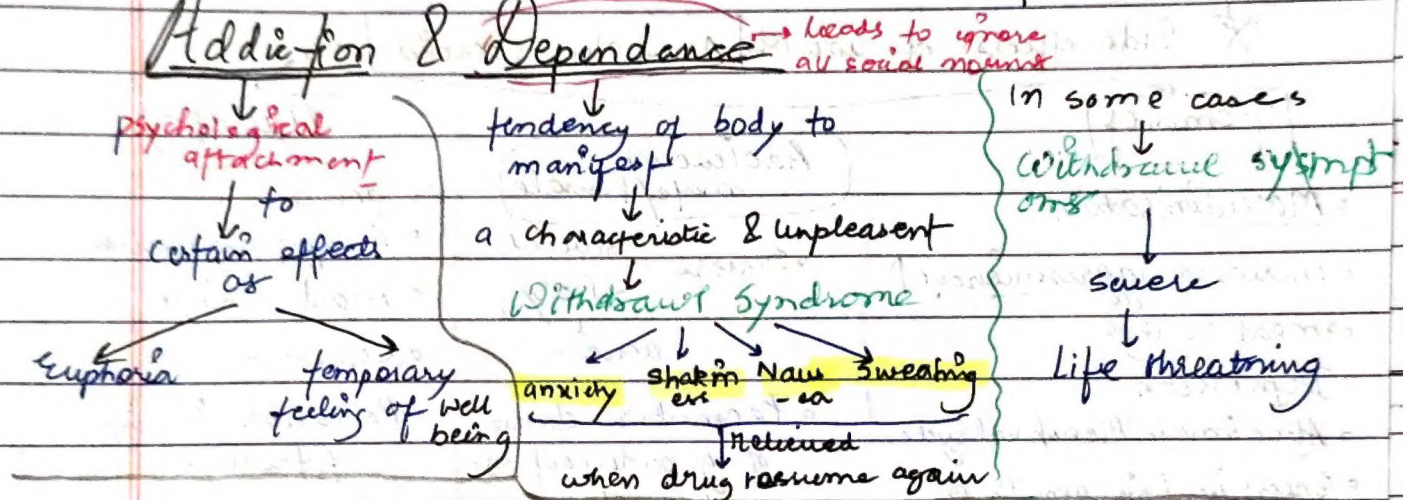
$\rightarrow \uparrow \text{CO in blood} \rightarrow \text{reduces conc. of haemoglobin } O_2 \rightarrow O_2 \text{ deficiency in body}$

on cigarette packing → one cannot miss statutory warning

Adolescence & Drug Abuse

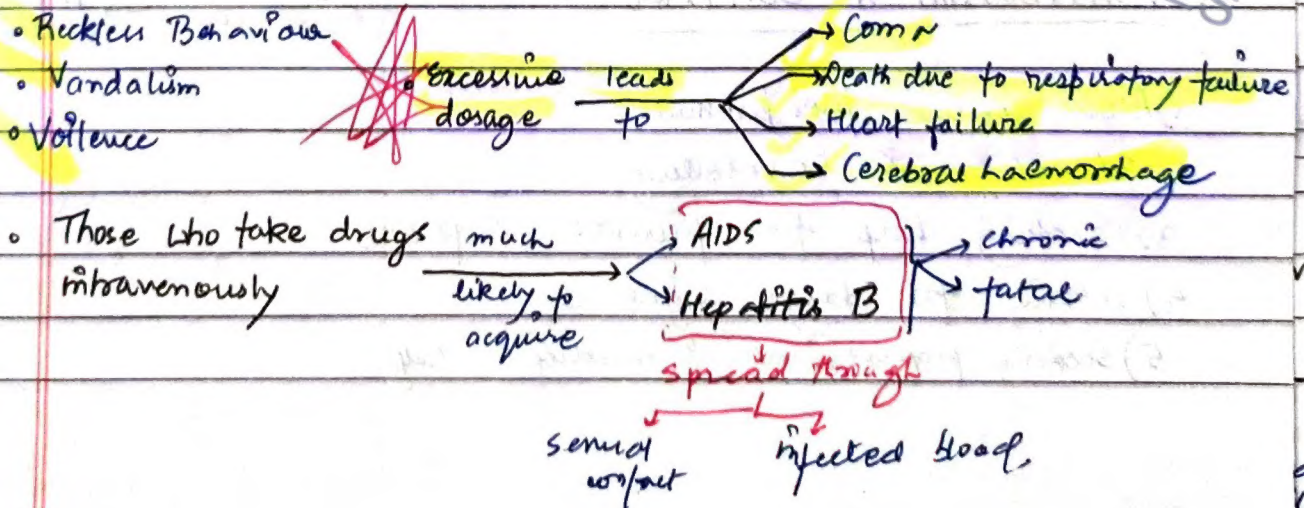


Addiction & Dependence



* Using drug once → fore runner to addiction

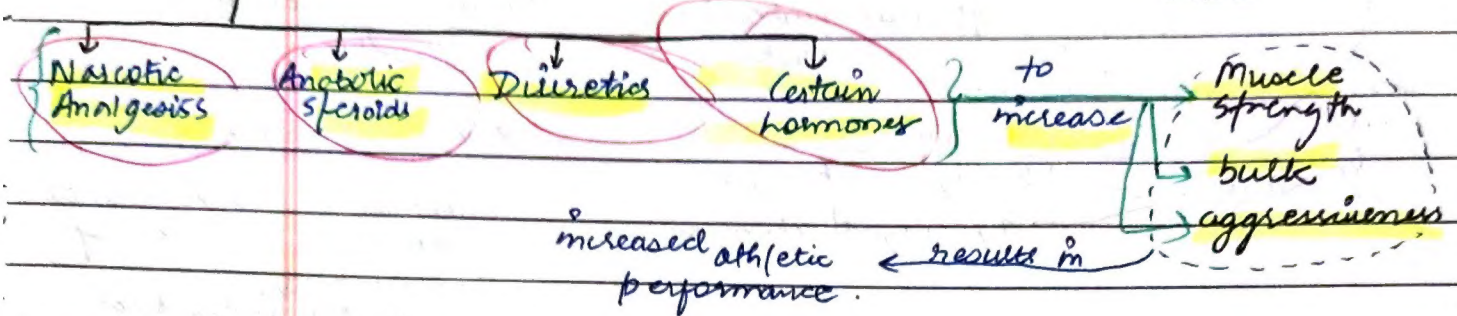
Effects of Drug/Alcohol Abuse



Chronic use of drugs & Alcohol } cause → ① Liver Cirrhosis
 ② Damage to nervous system

Use of drug & alcohol in pregnancy → adversely affects fetus

Misuse of Drugs by Sports person to enhance their performance



★ Side effects of use of Anabolic steroids in

Females

Adolescent male/Female

Males

<ul style="list-style-type: none"> ◦ Masculinisation ◦ Increased aggressiveness ↑ ◦ mood swings ◦ Depression ◦ Abnormal Menstrual cycle ◦ Excessive hair growth on face & body ◦ Enlargement of clitoris ◦ Deepening of female voice 	<ul style="list-style-type: none"> ◦ Severe facial acne ◦ Premature closure of growth centres of long bones ◦ results in stunted growth 	<ul style="list-style-type: none"> ◦ acne ◦ ↑ aggressiveness ◦ mood swings ◦ Depression ◦ Reduction in size of testicles ◦ Decreased sperm production ◦ Potential for dysfunction of kidney & liver ◦ Breast enlargement ◦ Premature Baldness ◦ Enlargement of prostate gland
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* The effect may be permanent with prolonged use.

* Prevention & control → "Prevention is better than cure" → drug & alcohol abuse too

- 1) Avoid undue peer pressure
- 2) Education & counselling
- 3) Seeking help from parents & peers
- 4) Looking for danger signs
- 5) seeking professional & medical help.

TANISHA SACHAN
 AIR 1747
 NCERT THREAD NOTES